

REMARKS

Claims 1-7 and 11-16 were pending in the application. In the Office Action mailed April 16, 2009, claims 1-7 and 11-16 are rejected. In the instant Amendment, claims 1-7 and 11-16 have been amended, and new claim 21 has been added. Upon entry of the instant Amendment, claims 1-7, 11-16 and 21 will be pending in the application.

Claims 1-7 have been amended to have the proper preamble. Support for the amendment is found in the specification at, e.g., p. 7, ll. 8-16.

Claim 1 has been amended to recite that the electrical steel contains Si in the amount of 2.0% to 6.5%. Support for this amendment is found, e.g., in the specification as filed, at page 9, line 2.

Claim 11 has been amended to make the claim language clearer. Claims 12-16 have been amended to depend on claim 11 and to make the claim language clearer.

Support for new claim 21 is found in the specification at p. 27, Table 3, Steel No. 27.

No new matter has been added by these amendments. The amendments are proper in that they place the application in condition for allowance or in better form for appeal.

Rejection under 35 U.S.C. § 103(a)

Claims 1 to 3 and 11 to 16 are rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP 09-241793 ("JP '793") or Japanese patent 09-209039 ("JP '039").

The Examiner is of the opinion that the claimed invention is not patentable because JP '793 discloses steel sheet compositions F and G in table 1 on page 5, which are processed according to examples 10, 11 and 12 in table 2 on page 6 to create Cu precipitation in the same manner as claimed by Applicant. The Examiner is further of the opinion that the claimed invention is not patentable because JP '039 discloses specific steel sheet examples 4, 6, 10, and 11 that meet the composition recited by claims 1 and 2; and are processed

according to paragraph [0020] by heat treatment at 500°C for 3 minutes and is within the claimed heat treatment limitations of 300 to 650°C for 5 seconds or more.

The presently claimed invention provides an electrical steel sheet, including a metal phase of fine Cu, the sheet having high strength, high wear resistance and with the magnetic properties or productivity that do not deteriorate in the way that conventional high strength electrical steel sheets deteriorate (see, the specification at p. 4, ll. 1-8), and a processed of part of such an electrical steel sheet. Applicants have discovered that silicon increases the volume resistivity of an electrical steel by minimizing the eddy current and reducing the core loss. To have the desired effect, Si is preferably at least 2.0% (see, the specification at p. 8, ll. 32-35). Example 2 shows that if Si is 3.1%, the core loss is significantly reduced (see, pp. 27-28, Tables 3 and 4). An electrical steel sheet also has certain commonly known structural features. For example, a person skilled in electrical steel sheet technology would have understood that a steel sheet having martensite structure cannot be used in an electrical steel sheet for the following reasons. First, if strain exists in martensite structure, iron loss deteriorates. Second, martensite structure contains very fine crystal, while electrical steel sheet must contain coarse grains. In addition, in an electrical steel sheet, [100] axis, which is easy to magnetize, is arranged to parallel to the sheet surface.

JP '793 is directed to an Fe-Cu alloy steel superior in a balance between strength and ductility and a balance between strength and toughness by controlling the crystal structure of Cu precipitates in the steel (see, JP '793, abstract). Significantly, JP '793 does not teach or suggest that its steel is an electrical steel. The Examiner cited Examples F and G consist of 0.14% and 0.15% Si, respectively, amounts well below the range that is necessary for providing the volume resistivity desired for the presently claimed steel. There is no teaching or suggestion in JP '793 of a Si range from 2.0 to 6.5% in an electrical steel sheet being critical for providing electromagnetic properties desired for an electrical steel sheet.

JP '793 also does not teach or suggest that its steel has the microstructure suitable for an electrical steel. For example, Composition E of Table 1 of JP '793, which contains the highest amount of exemplified Si content, 1.45%, corresponds to steel sheets nos. 8 and 9, which have a 2-phase martensite and ferrite microstructure (see, paragraph [0030]). As discussed above, a person skilled in the art would have understood that such a steel is not an electrical steel.

Therefore, JP '793 does not teach or suggest an electrical steel sheet, much less adding 2.0% to 6.5% of Si in an electrical steel for enhancing the volume resistivity and reducing the core loss. Therefore, JP '793 cannot anticipate or render obvious the claimed electrical steel.

JP '039 is directed to a cold-rolled steel sheet having high strength, excellent in press-forming nature and deep drawability, and method of manufacturing such steel sheet, which can be used as an inner plate for cars (see, JP '039 Abstract). JP '039 also does not teach that its steel sheet is an electrical steel sheet. In addition, JP '039 teaches that Si content exceeding 2.0% is not desirable (see, paragraph [0007]). A person skilled in the art would have understood that in order to have improved press-formability and deep-drawability, the crystal (111) plane must be parallel to the sheet surface. This is in contrast to the presently claimed electrical steel in which the [100] axis is arranged to parallel to the sheet surface.

Therefore, JP '039 does not teach or suggest an electrical steel sheet, nor adding 2.0% to 6.5% of Si in an electrical steel sheet for enhancing the volume resistivity and reducing the core loss. Therefore, JP '039 cannot anticipate or render obvious the claimed electrical steel sheet.

Therefore, Applicants respectfully submit that claims 1-7 and 11-17 are not anticipated under 35 U.S.C. § 102(b) by JP '793 or JP '039, nor rendered obvious under 35 U.S.C. § 103(a) by JP '793 and JP '039, either alone or in combination.

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed for issue.

Respectfully submitted,

KENYON & KENYON LLP

By: Weining Wang
Weining Wang
Reg. No. 47,164

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KENYON & KENYON LLP
One Broadway
New York, New York 10004
(212) 425-7200